Ubiquity and Reusability

Judy Nix, Ericsson

Ubiquity and reusability are key factors in driving the deployment of content. Up to now these elements have been challenges within mobile learning. However, with the advent of metadata structures, new technologies and mobile platforms, ubiquity and reusability are becoming a reality. It is important when introducing new learning platforms such as mobile learning that money and time is not spent creating complex ways to extract material that is already available in legacy systems.

Learning is moving from being teacher centric to learner centric. Ericsson is in the transitional phase, moving towards Personal Learning Environments whereby students will learn on the platforms which best support their learning styles.

The paper outlines the development of Ericsson Education's learning content deployment strategy for instructor led, elearning and mobile learning.

Ericsson's Training Situation

Ericsson designs and deploys telecommunication infrastructure / networks. Ericsson is the largest supplier of mobile systems in the world. The world's 10 largest mobile operators are among Ericsson's customers and some 40% of all mobile calls are made through Ericsson systems. Sony Ericsson is a joint venture between Sony and Ericsson to develop mobile handsets.

Ericsson is involved in the provision of learning services to its global customer base. Ericsson has world-class learning consultants globally supporting operators with the right competence at the right time. Ericsson's learning services ensure optimal return on investments by supporting the operators in planning, managing and delivering the right competence development according to their business goals. Our numbers speak for themselves. We train and educate up to 75 000 operator employees yearly. We have a network of 28 Training Centers worldwide and we delivered 285 238 student days in 2005. Currently Ericsson offers 714 course titles in different functional areas or job-categories across 400 course flows, covering different competence levels ranging from basic to advanced.

The delivery methods Ericsson offer include:

- Instructor-led training, or Classroom training
- eLearning
- Online services including scheduling, training reports etc
- Remote access training, where a customer trains on Ericsson equipment without having to leave their own country
- Virtual Classroom Training using online collaboration tools

- Blended Training solutions, where various types of training can be grouped; for example using elearning courses as a prerequisite to sitting instructor led courses

Blended Training involves a multi-faceted approach, using multiple types of training products, delivery and systems support. It begins with the development process; balancing the knowledge and skills requirements, appropriate training methodology and suitable delivery methods resulting in a mixed or blended training approach.

This is set against a rapidly changing technology background where courses can be either revised, updated or customised a number of times during a year. The changing technology background is evident to the "man in the street" through network speeds/services deployed by telecommunication operators.

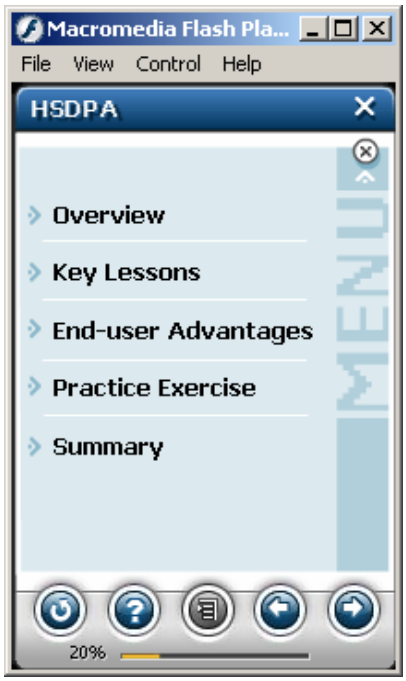
The challenge, then, is to be able to deploy all of this course material in a logical and professional way and to ensure that the quality and the relevance of the training content are paramount at all times. There is also a need of reuse of content, particularly for course material with gives an overview of a topic; the same text that is used in a classroom setting to describe a GSM network can be reused in an elearning course.

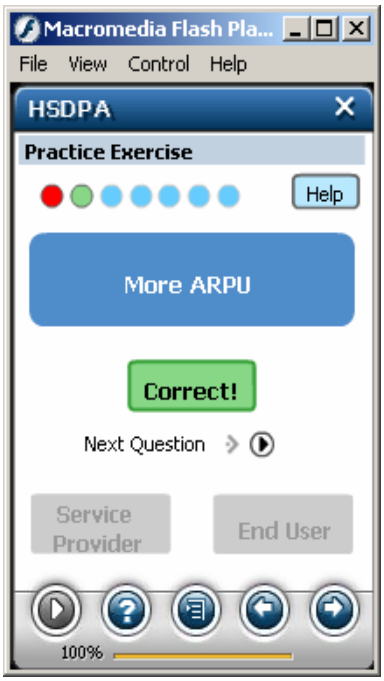
Background

Up to now Instructor Led Training (ILT) / classroom course material has been developed according to a Learning Product Development (LPD) process. This process provided for modularity, so allowed the reuse of some content. However, is has been identified that a Learning Content Management System (LCMS) would greatly increased reusability and cut down on development time.

eLearning students access course content on a PC via any variety of web browsers. As a result, traditional software development processes were used to create eLearning course content, testing for a number of platforms and web browsers. This would often lead to multiple deliveries of a course; for example, course content developed and tested in Internet Explorer would often have to be adapted to run in Netscape or Firefox browsers, due to their differing implementations of the DOM (Document Object Model). This then created a problem for content developers; specific versions of courses were created, stored and deployed across the various platforms, with detection carried out on the fly. Many content developers created content entirely in Flash or Authorware to deal with this issue; however this was not ideal for some training situations. For example, many companies lock down their IT infrastructure to prevent plugins being run, or network speed is not sufficient to allow students to access such media rich content.

mLearning has been at project stage up to recently. Content has been developed and deployed successfully using WAP, html and flashlite on smartphones





The wanted position has been the ability to deploy courseware to "ordinary" phones i.e. phones in common usage. As Ericsson is a provider of training to different Telecommunication Operators across the world who themselves operate in a multi-vendor world, it is impossible to designate a mobile learning phone. It is important to be able to target as many different phones as possible across all network categories.

To summarise, Ericsson has been developing courseware in three different silos to cater for ILT, eLearning and to a very small degree mLearning.

Market Situation

Ericsson announced in July 2005 that ownership of mobile devices had reached 2 billion for the first time. They forecast that ownership would reach 3 billion as early as 2010. This could happen earlier as the figure is in September 2006 reported to be 2.5 billion. This is for a world population of just over 6 billion.

Penetration of mobile devices in European countries is in the high 90% range and is fast approaching 100% as the following statistics show:

Country	Mobile Phone Penetration
Austria	103%
Belgium	88%
Cyprus	107%
Czech Republic	111%
Denmark	101%
Estonia	96%
Finland	102%

France	79%
Germany	91%
Greece	100%
Hungary	92%
Ireland	101%
Italy	111%
Latvia	96%
Lithuania	96%
Luxembourg	107%
Malta	107%
Netherlands	102%
Norway	106%
Poland	71%
Portugal	99%
Slovak Republic	85%
Slovenia	44%
Spain	94%
Sweden	113%
UK	108%

Data sources: WCIS (World Cellular Information Service) and Ovum.
Valid at end of December 2005

The barriers that previously hindered training delivery on mobile devices, such as network speed and handset capabilities have been overcome; the mobile handset has caught up with the PDA in terms of its computing power and media capabilities. This also means that traditional telephony is no longer the only use of these devices.

LMS & LCMS

Ericsson uses Sumtotal's Learning Management System to store, schedule and support training delivery. In tandem it also employs a Learning Content Management System (LCMS) from Giunti Labs. The LCMS allows the user to create and author courses. The LCMS facilitates the collaboration of several different authors on any given course. In addition, the components that make up a course can be centralized and shared across multiple courses. This tool allows developers to bundle learning objects together to create a course; a learning object is defined as any training-related content stored in the system. For example, a learning object can be a single image depicting a network diagram, or could equally represent an entire module of a course.

SCORM is used to tag training content in the LCMS; this applies equally to mLearning, eLearning and instructor-led training. For example, any Instructor-led (ILT) course has associated slides and student text books that need to be tagged and stored. It is also used to structure metadata and modules for reuse.

The metadata that is applied to content must be highly structured and clearly laid out. For example, each content area is tagged, within that individual modules are tagged, and so on down to individual elements such as an assessment, diagram, audio file and so on.

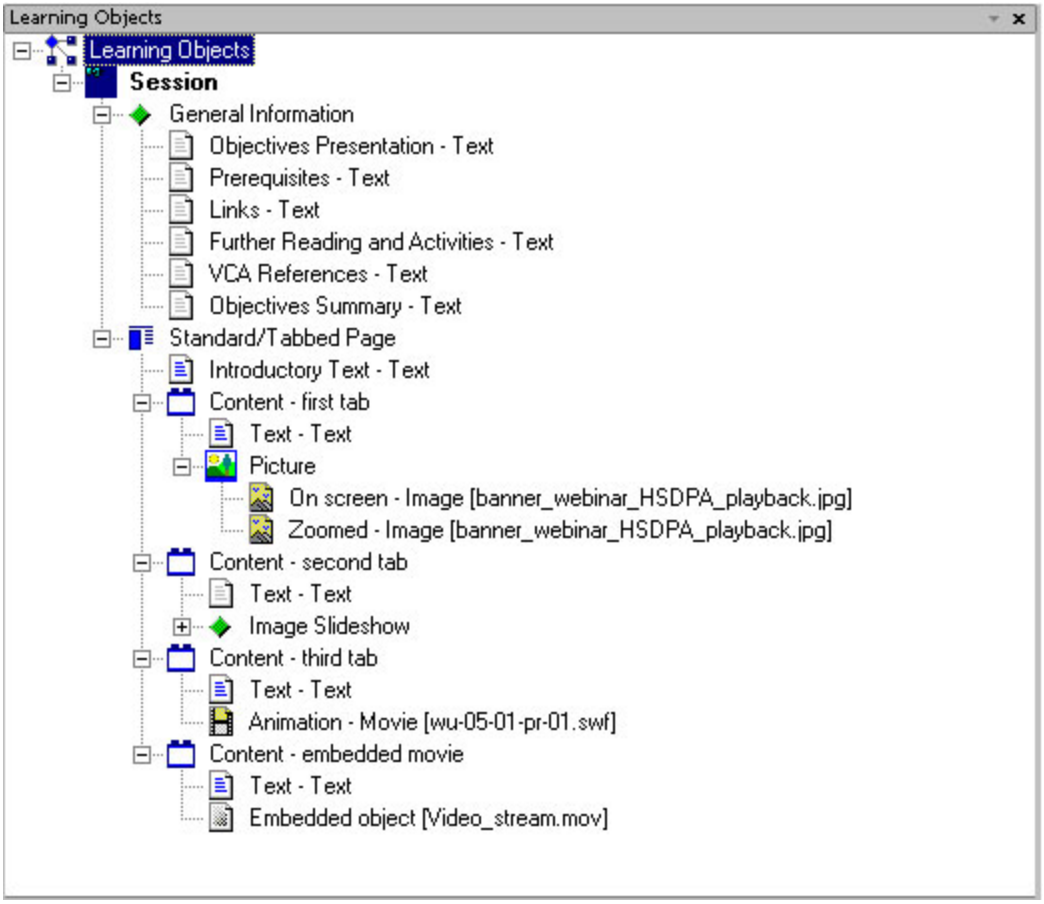
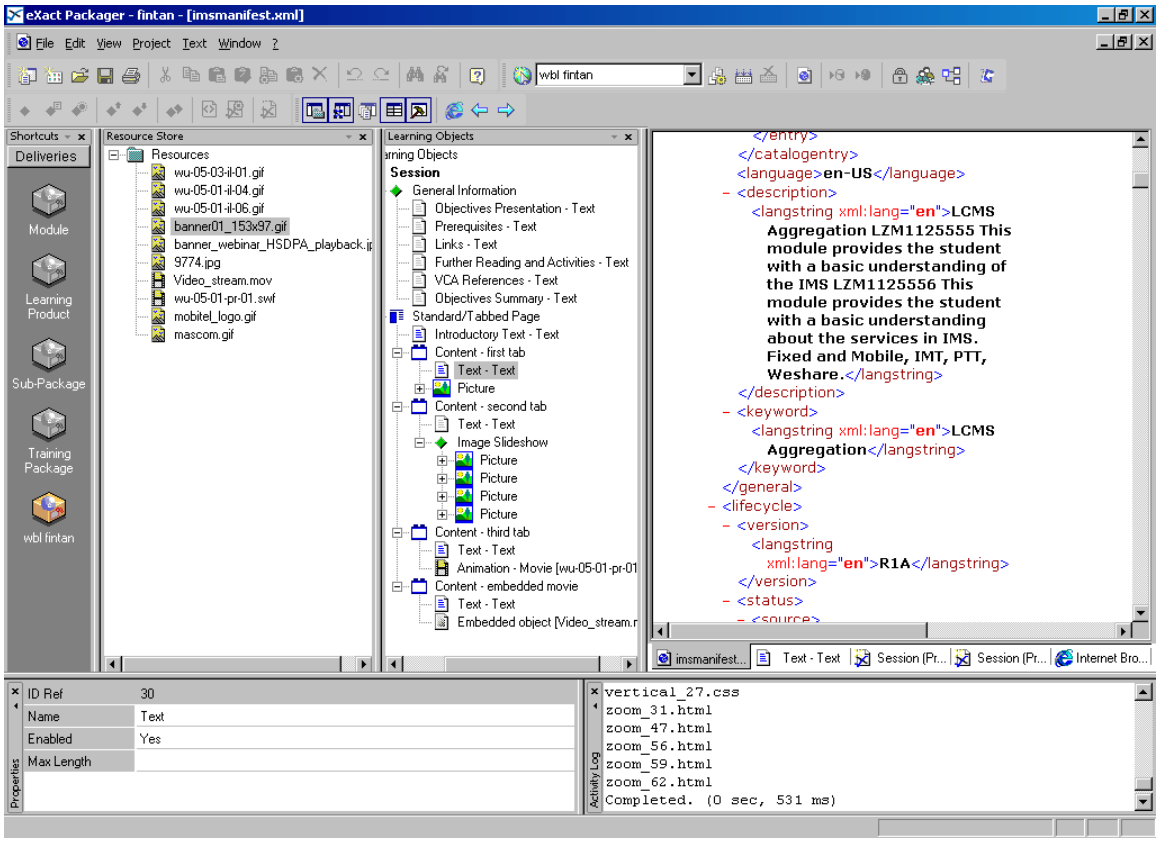


Fig. 1: A course outline in the LCMS

To allow for the use of multiple devices a number of templates are applied to the training content; for example for a mobile phone, a J2MEE template can be applied that will package the content in such a way that it can be downloaded and used in the same way one would download a game or ringtone.

Creating Course Content

In the LCMS, correctly tagged content is identified and grouped according to the needs of the audience at hand. A course developer bundles all of the resources in the system into a session which is then itself edited to insert metadata describing various aspects of the delivery.



Gary for replacement fig – preview of eLearning course

Fig.2: Course development in the LCMS

This metadata can include information about the subject area, the target audience, learning objectives and so on. It is also possible to add metadata for each individual element in the session – this is useful for example where you need to describe an individual animation or graphic in more detail. The level of tracking of the session is also set at this point; individual files can be tracked if required.

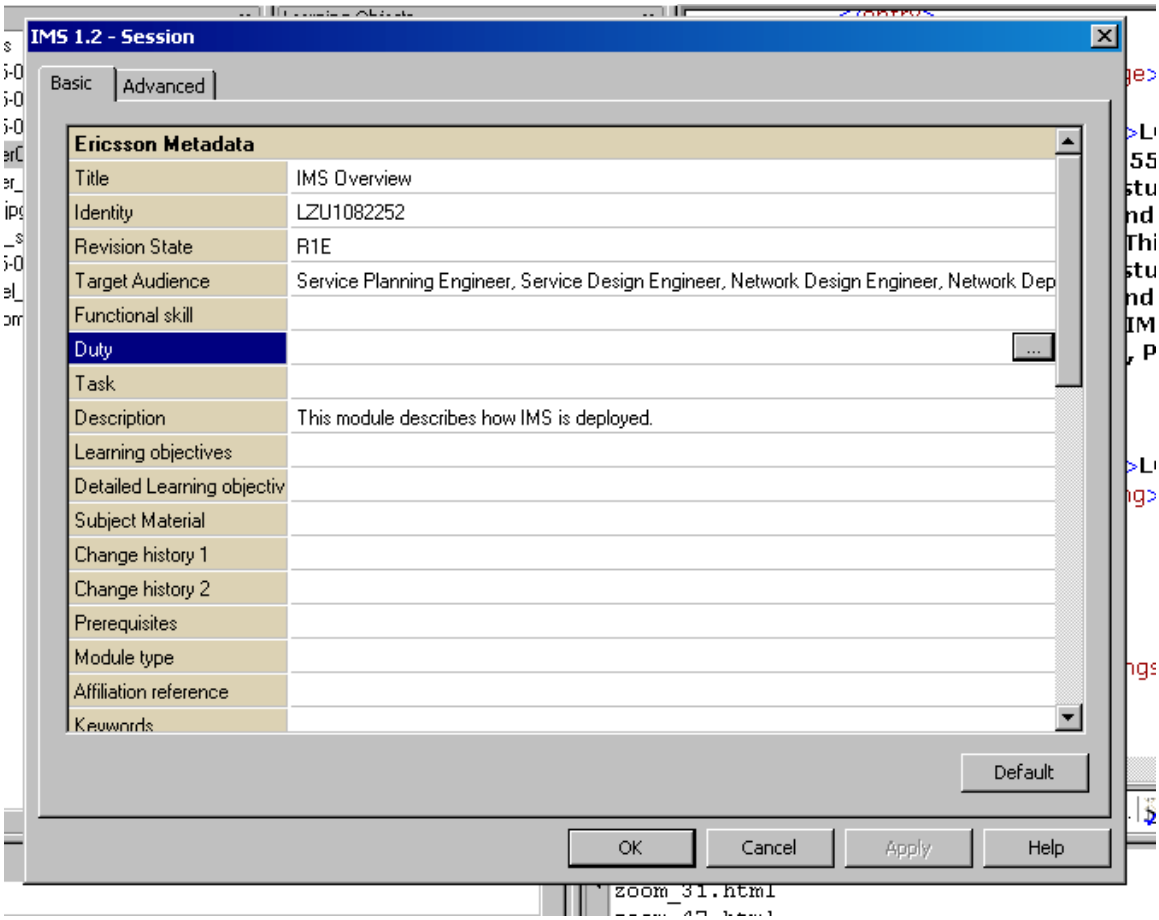


Fig. 3: Entering metadata

Reusability

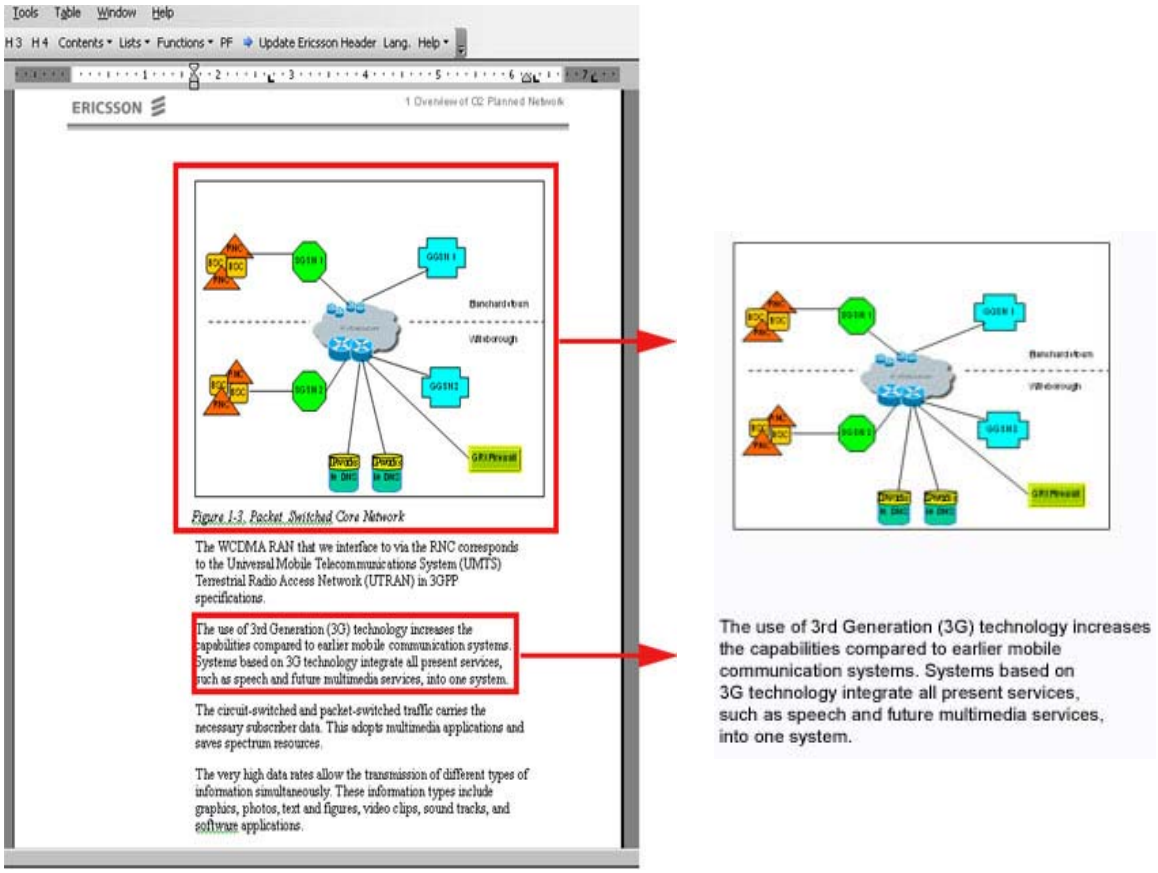
The main advantage of developing in this manner is the reusability of the training content. The way this is achieved is by the correct use of Metadata to tag content.

Metadata is infinitely flexible in terms of what it can describe; the content developer must tag content in a logical and structured way. For example, we may want to build a course consisting of to take the learning objectives from page one of a student textbook, along with the first diagram and the summary text at the end of a chapter. To correctly extract these bits of data, they would need to be individually tagged and pulled out of the system to be packaged by the LCMS.

To illustrate this, let us consider a student textbook used in a classroom delivery. These books can often run to hundreds of pages, with the training spread across several days. For obvious reasons, this is not appropriate for elearning or mobile learning deliveries; we need to take some well-defined subset of this material to deploy to these devices.

This leads to an obvious problem; when you are dealing with hundreds of pages of content, you will not realistically be able to tag everything at that low level. Rather it will be categorized by page or topic and so on.

To overcome this limitation, it is necessary to tag learning objects within their media types, i.e. within an instructor-led course we should mark certain sub-elements as being suitable for mobile learning, or elearning for example. Then we just extract those parts which are relevant for our delivery.



Fig, 7: Extract elements from a ILT textbook

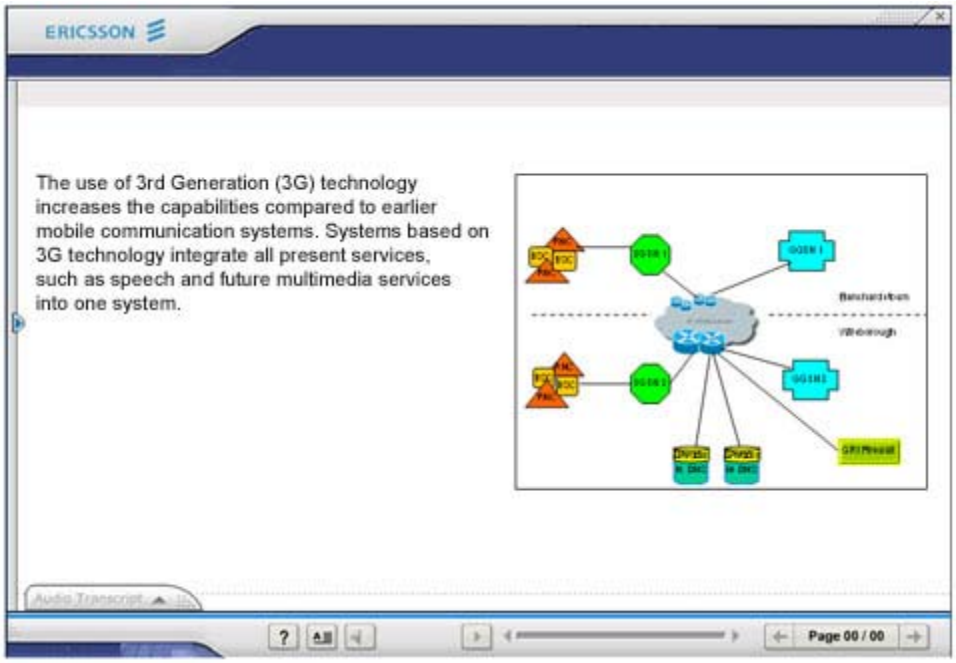


Fig. 8: Insert elements into elearning template

Using this system of tagging, a single ILT course can be "mined" to provide content for an elearning course, a mlearning course and so on. It will still be necessary to write some elements specifically for these delivery types, for example some complex images would need to be scaled down or redesigned altogether to be legible on a mobile device.

In addition, through the development of templates for ILT, eLearning and mLearning, it is now possible to guarantee and deploy the appropriate look and feel to course material regardless for what media it is developed for.

Ubiquity

Ubiquity is now guaranteed at a number of levels. Firstly, now all course developers have access to all resources regardless of for what media they were developed from one repository. As course developers in Ericsson are normally instructors this is even more important as the instructors are not grouped together in one training centre.

The current statistic for mobile phone is 2.5 billion worldwide. Most of these phones support java and html. By developing templates for java and flashlite enabled phones along with blackberries, the widest possible audience can be targeted. Considering Ericsson's customer base, this is very important.

The LMS can deploy customer portals which host the customers' training material, appropriate Ericsson courseware along with material from 3rd Party Suppliers. mLearning can be accessed through these portal through a mobile interface which allows students to download or stream the courseware. The LMS controls who has access to the courseware.

What next
Student Services can be enhanced through the provision of information on course descriptions and prerequisites via the mobile platform. This will enable course administration to become more personal to the student through their mobile device and add value to the training experience

Fully integrated blended learning will become a reality as course deliveries will a true blend of ILT, eLearning and mLearning moving towards a more learner centric environment.

Mobile Broadband will deliver advanced media to the mobile phone such as video and real-time interaction with the LMS. IP Multimedia Subsystem (IMS) will allow the introduction of a suite of services which have the potential to be used for education such as Push to Talk and WeShare. The Push to Talk Application enables real-time communication one-to-one and one-to-many with the press of a button. WeShare is a family of services enabling the sharing of pictures and video while talking. These have the potential to allow mobile tutoring on the fly.

References:
Landers, Paul 2005: Meta Learning: Experiences from the Inclusion of mLearning in a Standards-based and Corporate-wide Learning Content Management Policy mLearn 2005 South Africa.

Ericsson Company Facts www.ericsson.com

Mobile Learning: the Next Generation of Learning
http://learning.ericsson.net/mlearning2/

Incorporation of Mobile Learning into Mainstream Education
www.ericsson.com/mlearning 3

Graham, Katy 2006: Mobile Tutoring and Telecommunications
http://www.ericsson.com/ericsson/corpinfo/programs/resource_documents/eclo_presentation_katy_graham.pdf

Get Ready for .mobi
http://www.ericsson.com/mobilityworld/sub/articles/other_articles/06nov08_dotmobi